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CHAPTER II

TRANSMITTAL LETTER TO THE UNITED STATES ELECTED OFFICE (EO/US)

(ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)

<u>PCT/FI00/00480</u>	<u>30 May 2000 (30.05.00)</u>	<u>17 June 1999 (17.06.99)</u>
INTERNATIONAL APPLICATION NO	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED

ELEMENT FOR SEPARATING AN ELECTROLYTIC TANK

TITLE OF INVENTION

Tuomo KIVISTÖ (Jorvas, Finland)

APPLICANT(S)

Box PCT
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P.O. Box 2327
Arlington, Virginia 22202

Attention: EO/US

1. This national phase application claims priority of the following national application(s):

Finnish Patent Application No. 991389 filed June 17, 1999.

2. Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 USC 371:

- A. ☒ This express request to immediately begin national examination procedures (35 USC 371(f)).
- B. ☒ The U.S. National Fee (35 USC 371(c)(1) and other fees (37 CFR 1.492) indicated in the attached fee calculation sheet.

3. ☒ A copy of the International application as filed [35 USC 371(c)(2)]:

- a. ☐ is transmitted herewith.

- b. ☐ is not required as the application was filed with the United States Receiving Office.
- c. ☒ has been transmitted
- i. ☒ by the International Bureau. Date of mailing of the application (from form PCT/IB/308): 28 December 2000 (28.12.00).
- ii. ☐ by applicant on (date) _____.
4. ☒ A translation of the International application into the English language [35 USC 371(c)(2)]:
- a. ☐ is transmitted herewith.
- b. ☒ is not required as the application was filed in English.
- c. ☐ was previously transmitted by applicant on (date) _____.
- d. ☐ will follow (within 32 months of earliest priority date).
5. ☒ Amendments to the claims of the International application under PCT Article 19 [35 USC 371(c)(3)]:
- a. ☐ are transmitted herewith.
- b. ☐ have been transmitted
- i. ☐ by the International Bureau. Date of mailing of the amendment (from form PCT/IB/308): _____.
- ii. ☐ by applicant on (date) _____.
- c. ☒ have not been transmitted as
- i. ☒ applicant chose not to make amendments under PCT Article 19. Date of mailing of Search Report (from form PCT/ISA/210): 02 October 2000 (02.10.00).
- ii. ☐ the time limit for the submission of amendments has not yet expired. The amendments or a statement that amendments have not been made will be transmitted before the expiration of the time limit under PCT Rule 46.1.
6. ☒ A translation of the amendments to the claims under PCT Article 19 [35 USC 371(c)(3)]:
- a. ☐ is transmitted herewith.
- b. ☐ is not required as the amendments were made in the English language.
- c. ☒ has not been transmitted for reasons indicated at point 5c above.

7. [x] A copy of the International Preliminary Examination Report (PCT/YPEA/409)
 - a. [x] is transmitted herewith.
 - b. [] is not required as the application was filed with the United States Receiving Office.
8. [x] Annex(es) to the International Preliminary Examination Report
 - a. [] is/are transmitted herewith.
 - b. [] is/are not required as the application was filed with the United States Receiving Office.
 - c. [x] is/are not being transmitted as there is/are no Annex(es).
9. [x] A translation of the annexes to the International Preliminary Examination Report
 - a. [] is transmitted herewith.
 - b. [] is not required as the annexes are in the English language.
 - c. [x] is not being transmitted for the reason indicated at point 8c above.
10. [x] An oath or declaration of the inventor [35 USC 371(c)(4)] complying with 35 USC 115
 - a. [] was previously submitted by applicant on (date) _____.
 - b. [] is submitted herewith and such oath or declaration
 - i. [] is attached to the application
 - ii. [] identifies the application and any amendments under PCT Article 19 which were transmitted as stated in points 5a or b; and states that they were reviewed by the inventor as required by 37 CFR 1.70.
 - c. [x] will be provided in response to a Notice to File Missing Requirements.
11. [x] An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):
 - a. [] is transmitted herewith.
 - b. [x] has been transmitted by the International Bureau. Date of mailing (from form PCT/IB/308): 28 December 2000 (28.12.00).
 - c. [] is not required as the application was searched by the United States International Searching Authority.
 - d. [] will be transmitted promptly upon request.

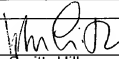
JC10 Rec'd PCT/PTO 29 NOV 2001

- e. ☐ has been submitted by applicant on (date) _____.
12. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98:
- a. ☐ is transmitted herewith.
- Also transmitted herewith is
- ☐ Form PTO-1449
- ☐ Copies of citations listed
- b. ☐ will be transmitted within THREE MONTHS of the date of submission of requirements under 35 USC 371(c).
- c. ☐ was previously submitted by applicant on (date) _____.
13. ☐ The applicant claims small entity status with respect to this application.
- ☐ A Verified Statement Claiming Small Entity Status is attached.
- ☐ The undersigned claims small entity status on behalf of the applicant.
14. ☐ An assignment document is transmitted herewith for recording. A separate ☐ "RECORDATION COVER SHEET" is also attached.
- _____
- _____
- _____
15. ☒ Additional documents
- a. ☐ Copy of request (PCT/RO/101)
- b. ☒ International Publication No. WO 00/79024
- i. ☐ Specification, claims and drawing
- ii. ☒ Front page only
- c. ☒ Preliminary amendment
- d. ☒ Abstract
- e. ☐ Other
- _____
16. ☒ The above checked items are being transmitted
- a. ☒ before 30 months from any claimed priority date.

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- b. ☐ after 30 months but before 32 months (surcharge and/or processing fee included) from any claimed priority date.
17. ☐ Certain requirements under 35 USC 371 were previously submitted by the applicant on _____, namely:



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14. (New) A separating element according to claim 1, characterized in that at least a first edge of each support member arranged in succession mainly in the motional direction of the separating element is provided with a bracket, and at least a second edge is provided with a recess, so that the bracket of the preceding support member is arranged to fit in the recess of the following support member.

15. (New) A separating member according to claim 1, characterized in that the separating element comprises several parallel, in the motional direction successive support members that are spaced apart and arranged transversely to the motional direction of the separating element.

16. (New) A separating element according to claim 1, characterized in that at least part of the solids cleaning arrangement is attached in the separating element.

17. (New) A separating element according to claim 16, characterized in that in the separating element, there are attached means for feeding cleaning agent to the bottom part of the electrolytic tank.

18. A separating element according to claim 16, characterized in that in the separating element, there are attached means in order to conduct at least part of the solids away from the electrolytic tank.

REMARKS

The above amendments are presented in order to place this application in better condition for examination.

Respectfully submitted,



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Abstract

A separating element for separating the bottom part of an electrolytic tank from the rest of the tank space in connection with the removal of solids settled on the bottom of the electrolytic tank, said separating element being installable in the electrolytic tank and removable therefrom along a path formed by support and control members arranged in the electrolytic tank. The separating element comprises a flexible wall element and at least one set of support members arranged in the wall element.

ELEMENT FOR SEPARATING AN ELECTROLYTIC TANK

The present invention relates to a separating element for separating the bottom
5 part of an electrolytic tank from the rest of the tank space in connection with
removing the solids settled on the bottom of the tank, which separating
element can be installed in the electrolytic tank and removed therefrom along a
path arranged in the electrolytic tank by means of support and control
members.

10

In electrolytic processes, metals such as copper, nickel and zinc, are
precipitated on the surfaces of cathodes located in the electrolytic tank, starting
either with metal anodes that are dissolved into the electrolyte present in the
electrolytic tank, or with metal ions that are already dissolved into the
15 electrolyte. However, all solids are not precipitated onto the cathode surfaces,
for example precious metals and solid impurities present in the electrolyte.
Therefore on the bottom of electrolytic tanks, there are accumulated, along
with the metal refining process, various solids that must from time to time be
removed from the tank, for instance because said solids contain valuable
20 ingredients, such as precious metals, or because a thicker solids accretion
threatens the purity of the cathode obtained from the electrolytic process.

Usually the solids accumulated in the electrolytic tank are at least partly very
finely divided and only somewhat heavier than the electrolyte, wherefore it is
25 difficult to separate the solids from the electrolyte. During the electrolytic
process, the circulation of the solids from off the bottom of the electrolytic tank
is very harmful, because in that case there is a particularly high risk that the
solids proceed onto the cathode, and this would essentially weaken the purity
of the metal to be produced.

30

The removal of the solids accumulated on the bottom of an electrolytic tank
usually requires that the whole electrolytic process must be interrupted, which

reduces the efficiency per time, i.e. the productivity of the electrolytic plant. Hence the removal of solids must be arranged so that it forms part of the process of replacing the electrodes, i.e. anodes and cathodes; this, however makes the replacement process complicated and slow, and also restricts the
5 removal of solids to take place in the rhythm dictated by the process of replacement. Moreover, a remarkable amount of the electrolyte must be first removed from the tank and then fed back therein, which generally leads to harmful effects in the electrolyte quality and causes a lot of extra work. Into the solids treatment system, there also flows a remarkable amount of electrolyte,
10 which must be replaced with new and may be harmful in the further treatment of the solids. Moreover, the manual washing of the electrolytic tanks makes the process clearly more labor-intensive and subjects the employees to various health hazards, among others owing to the effects of the ingredients contained in the splashes and spray emanating from the tank. In addition, owing to the
15 personnel required by the washing of the tanks, the automatization of the electrode treatment is often nearly impossible, which further increases the labor demand in an electrolytic plant.

From the international patent application WO 99/11841, there is known a
20 separating element for separating the bottom part of an electrolytic tank from the rest of the tank space in connection with the removal of the solids settled on the tank bottom. In said publication, in the electrolytic tank there are arranged support and control members that form the trajectory of the separating element, so that the separating element can be placed in the
25 electrolytic tank and removed therefrom through a space provided in between at least one end wall and the electrode placed nearest to said end wall. In the arrangement according to said publication, the separating element consists of several, flexibly interconnected structure elements that enable the bending of the separating element when shifting from the vicinity of the end wall to the
30 vicinity of the electrolytic tank bottom. The structure specified in said publication is complicated and troublesome to manufacture. In addition, in between the elements of the structure, there may accumulate impurities that

are harmful for the operation of the separating element. Moreover, the known separating element, described in said publication, is also difficult to keep clean.

- 5 The object of the present invention is to eliminate some of the drawbacks of the prior art and to achieve a novel separating element for electrolytic tanks that is new in structure and more efficient in operation. The essential novel features of the invention are apparent from the appended claims.
- 10 The separating element according to the invention comprises a flexible wall element and support members arranged in said wall in order to prevent excessive bending of the wall element at least in one direction. By means of the structure according to the invention, there is achieved a simple and uniform separating element that is secure in operation, to be used in connection with
- 15 the removal of solids settled in an electrolytic tank. Owing to the flexibility of the separating element, the trajectory of the separating element can be designed to proceed in a desired fashion, for example from an essentially vertical direction near the end wall of the electrolytic tank to an essentially horizontal direction near the bottom wall of the electrolytic tank.
- 20 According to the invention, the separating element comprises at least a first set of support members arranged in succession mainly in the motional direction of the separating element. The first set of support members typically reinforce the flexible wall element of the separating element and tend to keep it straight, at
- 25 the same time allowing bending according to the desired trajectory.

- Moreover, the separating element comprises at least another set of support members arranged in the wall element, essentially transversally mainly with respect to the motional direction of the separating element. The transversal
- 30 support members reinforce the wall element in the direction transversal to the motional direction. The transversal support members can also be used as

pulling members when moving the separating element by an actuator, such as a drive wheel.

The separating element according to the invention comprises at least a third
5 set of support members, arranged on the opposite side of the wall element with
respect to the first longitudinal support members, said third set of support
members being arranged in succession, mainly in the motional direction of the
separating element, in order to prevent an excessive bending of the wall
element at least in one more direction. The third set of support members is
10 arranged to prevent the bending of the wall element with a too short bending
radius when moving the separating element. Preferably the support members
include restricting members, such as brackets, that keep the bending radius in
the desired magnitude. The uniform wall element forms a compact surface and
is easy to keep clean.

15 The invention is described in more detail below, with reference to the
accompanying drawings, where
figure 1 illustrates a preferred embodiment of the invention in an electrolytic
tank, seen as a partial side-view cross-section,
20 figure 2 illustrates the embodiment of figure 1 in the direction A - A,
figure 3 shows a separating element according to the invention in a simplified
side-view illustration, and
figure 4 illustrates a simplified version of the embodiment of figure 3, seen in
the direction of the arrow B.

25 Figures 1 and 2 represent a general illustration of an electrolytic tank 1, where
there are in turns placed electrodes, anodes 2 and cathodes 3, and the metal
to be produced in the electrolytic process is precipitated onto the cathode by
means of the electrolytic solution 4 present in the electrolytic tank. During the
30 electrolytic process, on the bottom 5 of the electrolytic tank 1 there are settled
solids 6 that should be removed from the electrolytic tank from time to time. In
connection with the electrolytic tank, preferably in the side walls 7, 8, there are

provided support and control members 9. By means of said support and control members 9, the separating element 10 is supported while it is placed in the electrolytic tank 1 and controlled when it is being placed in the electrolytic tank, and the trajectory of said separating element is formed mainly under the
5 guidance of said support and control members. Typically the support and control members 9 are grooves made in the opposite walls 7, 8 of the tank, in which grooves the side edges of the separating element 10 are arranged to fit.

The separating element comprises a flexible wall element 11 and at least one
10 set of support members 12, 12', 13, 14 arranged in said wall element 11. The support members are arranged in the wall element 11 mainly in order to prevent an excessive bending of the wall element 11, at least in one direction transversal to the motional direction of the separating element.

15 The separating element 10 comprises at least one set of support members 13 arranged in succession in the motional direction of the separating element. The separating element 10 comprises at least another set of support members 12, 12', arranged in the wall element 11, mainly essentially transversally to the motional direction of the separating element. The separating element 10
20 comprises at least a third set of support members 14 provided on the opposite side of the wall element 11 with respect to the first longitudinal set of support members 13, said support members 14 being arranged in succession mainly in the motional direction of the separating element, mainly in order to prevent an excessive bending of the wall element 11 at least in one more direction.

25

Each of the first support members 13 is advantageously installed in the wall element 11 in the longitudinal direction of the separating element, at the middle section thereof. Typically the support members 13, 14 arranged in succession in the motional direction are in the motional direction of the separating element
30 longer than in the direction transversal to the motional direction. Typically the support members 13, 14, arranged in succession in the motional direction, are attached to the transversal support members 12, 12'. The transversal support

members 12, 12' may extend to the whole width of the wall element 11, or to a part thereof only. The transversal support members 12, 12' located on the opposite sides of the wall element 11 can typically be different in length, so that on the first side of the wall, the support members 12 are for instance essentially as
5 wide as the whole wall element 11, and on the other side the transversal support members 12' can be very short, and they can be used mainly for fastening the support members 13, 14, arranged in succession in the motional direction, to the wall element 11. Moreover, the transversal support members 12, 12' can typically be used as pulling means when moving the separating
10 element by an actuator, such as a drive wheel 17.

At least one first edge of each support member 13, 14 arranged in succession mainly in the motional direction of the separating element 10 is provided with a bracket 15, 15', and another edge is provided with a recess 16, 16', so that
15 when the support members are arranged in succession, the bracket 15 of the preceding support member is arranged to fit in the recess 16, 16' of the following support member. The brackets 15, 15' and the recesses 16, 16' are mainly arranged to serve as restricting elements, so that by means of them, it is attempted to restrict an excessive bending of the separating element and on
20 the other hand to keep the separating element straight, among others. In the embodiment according to figure 3, the brackets 15, 15' are narrowed towards the outer edge, and the recesses 16, 16' are respectively narrowed towards the inside.

25 The separating element 10 typically comprises several parallel support members spaced apart and arranged in succession in a direction transversal to the motional direction of the separating element. In a preferred embodiment (figure 4), the number of parallel support members 13, 14 arranged in succession in the motional direction is two on both side surfaces of the wall
30 element. Naturally the number of the parallel support members may vary according to the requirements of the embodiment in question.

According to a preferred embodiment, the support members 14 of the third set are used to achieve a desired free bending radius for the separating element, and on the other hand the transmit the moving force to the separating element particularly in the bent parts of the tank, so that a so-called crumpling of the wall element 11 is avoided. The first set of the support members 13 is used to keep the separating element straight, and on the other hand to transmit the moving force particularly in the straight parts of the tank.

Most advantageously the wall element 11 is made of some web-like material. The material must endure, among others, the effects that the electrolyte contained in the electrolytic tank causes in said web-like material. The wall element can be made of metal or plastic, for instance. It is typically made of for example stainless steel, such as acid-proof steel. As for its thickness, the wall element is relatively thin. A typical thickness is for instance 0.5 - 5.0 mm, depending on the material.

Typically the support members 12, 12', 13, 14 are made of metal, such as stainless steel, particularly acid-proof steel. The support members are attached to the wall element typically by fastening means, such as screws. Other ways of fastening, such as adhesion or welding, may also be possible, depending on the type of embodiment in question.

In the separating element 10, there can be attached at least part of the cleaning arrangement 18, 19 of the electrolytic tank bottom, in which case the cleaning arrangement moves along with the separating element into the tank and away therefrom. In the separating element 10, there may be attached members for feeding cleaning agent into the electrolytic tank bottom, such as washing nozzles 18 or mechanical solids removal devices. The separating element may also be provided with members 19 in order to conduct at least part of the solids away from the electrolytic tank. The separating element includes, at least on one side thereof, a space 20, in between adjacent support members that are located in succession in the motional direction; said space

20 can be used for placing various pipe elements, for instance hoses for conducting washing liquid into the washing nozzles, or for conducting solids out.

- 5 For a man skilled in the art it is obvious that the invention is not restricted to the embodiments described above, but it can be modified within the scope of the appended claims.

CLAIMS

1. A separating element for separating the bottom part of an electrolytic tank from the rest of the tank space in connection with the removal of the solids
5 settled on the electrolytic tank bottom, said separating element being installable in the electrolytic tank and removable therefrom along a path formed by support and control members arranged in the electrolytic tank, **characterized** in that the separating element (10) comprises a flexible wall element (11) and at least one set of support members (12, 12', 13, 14)
10 arranged in said wall element (11).
2. A separating element according to claim 1, **characterized** in that the separating element (10) comprises at least one set of support members (13)
15 arranged in succession mainly in the motional direction of the separating element.
3. A separating element according to claim 1 or 2, **characterized** in that the separating element (10) also comprises at least another set of support members arranged in the wall element (11) and being essentially transversal
20 mainly to the motional direction of the separating element.
4. A separating element according to any of the preceding claims 1 - 3, **characterized** in that the separating element (10) comprises at least a third set of support members (14) arranged in succession mainly in the motional
25 direction of the separating element, on the opposite side of the wall element with respect to the first set of longitudinal support members.
5. A separating element according to any of the preceding claims 1 - 4, **characterized** in that each first support member (13) and/or third support
30 member (14) is installed in the wall element (11) at the middle section of the support member (13, 14).

6. A separating element according to any of the preceding claims 1 - 5, **characterized** in that at least a first edge of each support member (13, 14) arranged in succession mainly in the motional direction of the separating element is provided with a bracket (15, 15'), and at least a second edge is
5 provided with a recess (16, 16'), so that the bracket (15, 15') of the preceding support member is arranged to fit in the recess (16, 16') of the following support member.
7. A separating element according to any of the preceding claims 1 - 6,
10 **characterized** in that the separating element (10) comprises several parallel, in the motional direction successive support members (13, 14) that are spaced apart and arranged transversally to the motional direction of the separating element.
- 15 8. A separating element according to any of the preceding claims 1 - 7, **characterized** in that at least part of the solids cleaning arrangement (18, 19) is attached in the separating element (10).
9. A separating element according to claim 8, **characterized** in that in the
20 separating element (10), there are attached means (18) for feeding cleaning agent to the bottom part of the electrolytic tank (1).
10. A separating element according to claim 8, **characterized** in that in the
25 least part of the solids (6) away from the electrolytic tank (1).

(19) World Intellectual Property Organization
International Bureau

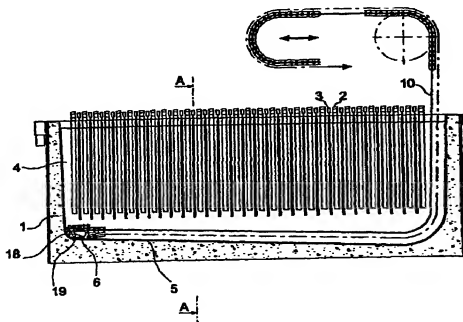


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28 December 2000 (28.12.2000)

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- (30) Priority Data: 991389 17 June 1999 (17.06.1999) FI
- (71) Applicant (for all designated States except US): OUTOKUMPU OYJ [FI/FI]; Riihitontuntie 7, FIN-02200 Espoo (FI).
- (72) Inventor; and
(75) Inventor/Applicant (for US only): KIVISTÖ, Tuomo [FI/FI]; Hirsalantie 259, FIN-02420 Jorvas (FI).
- (54) Title: ELEMENT FOR SEPARATING AN ELECTROLYTIC TANK
- (81) Designated States (national): AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (regional): Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).
- Published:
— With international search report.
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.



(57) Abstract: A separating element (10) for separating the bottom part of an electrolytic tank from the rest of the tank space in connection with the removal of the solids (6) settled on the bottom of the electrolytic tank (1), said separating element being installable in the electrolytic tank and removable therefrom along a path formed by support and control members (9) arranged in the electrolytic tank. The separating element (10) comprises a flexible wall element (11) and at least one set of support members (12, 13, 14) arranged in the wall element (11).

WO 00/79024 A1

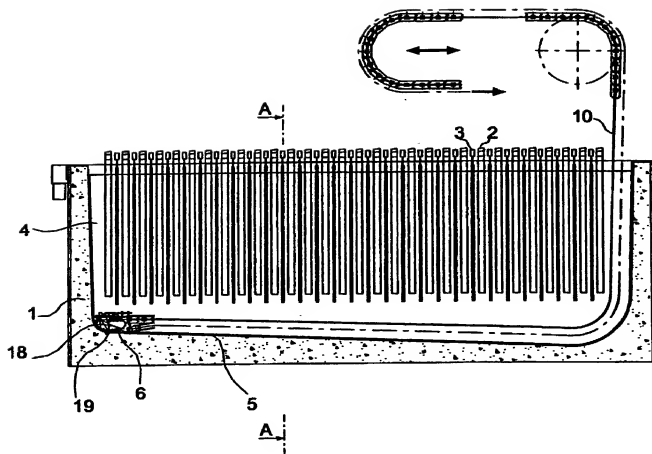


Fig. 1

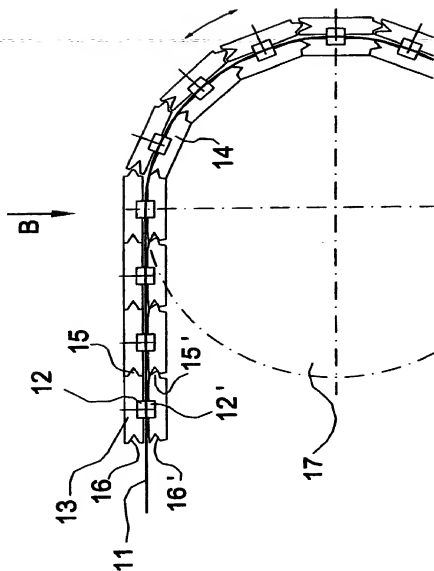


Fig. 3

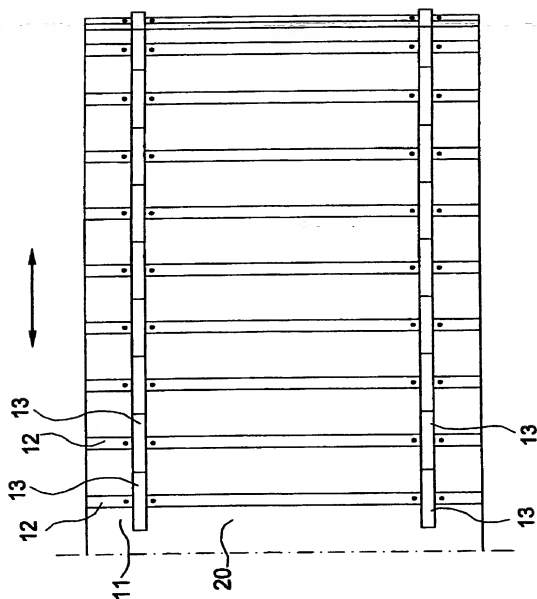


Fig. 4

DECLARATION FOR PATENT APPLICATION
(COMBINED WITH POWER OF ATTORNEY)
(ORIGINAL APPLICATION)

COPY

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name. I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:
Separating element for separating the bottom part of a tank from the rest of the tank

the specification of which is attached hereto unless box (a) or (b) is checked, in which case

- (a) ☐ the specification was filed on _____ as Application No. _____.
- (b) ☒ the specification was filed as PCT International Application No. PCT/F100/00484 filed on 30 May 2000 and was amended under PCT Art. 19 on _____ (if any).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Sec. 1.56.

I have identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America and filed less than 12 months (6 months for designs) prior to this United States application and of which I claim foreign priority benefits under Title 35, United States Code, Sec. 119, and I have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

EARLIEST FOREIGN APPLICATION, AND ALL FOREIGN
APPLICATIONS FILED MORE THAN 12 MONTHS (6 MONTHS FOR DESIGN)
PRIOR TO THIS U.S. APPLICATION

<u>Country</u>	<u>Application No.</u>	<u>Date of Filing</u> (month/day/year)
<u>Finland</u>	<u>991389</u>	<u>17 June 1999</u>
_____	_____	_____

As a named inventor, I hereby appoint the practitioners associated with **Customer Number 007812** (John Smith-Hill, Reg. No. 27,730 and Daniel J. Bedell, Reg. No. 30,156) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith and in connection with the resulting patent.

Send ~~correspondence to the~~ correspondence address associated with Customer Number 007812.

I hereby authorize the practitioners that I have appointed to accept instructions regarding this application and the resulting patent from OUTOKUMPU OYJ.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Title 18, United States Code, Sec. 1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first joint inventor _____

KIVISTÖ, Tuomo

10 Inventor's signature _____

Date _____ Country of Citizenship Finland

Residence Kirkkonummi, Finland

FIX

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Full name of second joint inventor, if any _____

Inventor's signature _____

Date _____ Country of Citizenship _____

Residence _____

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